C l a i m s

1.

Method for finding the Reflection Coefficient (RC) of reflectors in the subsurface, said
method comprising:

a) migrating to depth recorded traces in a survey by Pre-Stack Depth Migration
(PSDM), thereby achieving a real depth migrated seismic cube $P_{Obs}(\vec{x})$ which is a
function of the recorded traces that each has been given a weight $w_i(\vec{x})$;

b) interpreting $P_{Obs}(\vec{x})$ to find the reflectors in the subsurface, based on these reflectors
and the seismic velocities, an earth model is established in the computer, one of the
reflectors in the earth model is chosen to be the target reflector;

c) computing synthetic traces from the target reflector for all shot/receiver pairs in the
survey that was used in a);

c h a r a c t e r i z e d   b y

d) setting the RC of the target reflector in the depth model to an essentially constant
value when the synthetic traces are computed;

e) doing a local PSDM of the synthetic traces in a band around the target reflector to
obtain a modeled PSDM cube $P_{Mod}(\vec{x})$; and

f) measuring the amplitudes along target reflector on the real PSDM cube $P_{Obs}(\vec{x})$,
dividing these measurements by the corresponding measurements from the modeled
PSDM cube $P_{Mod}(\vec{x})$, thereby obtaining an estimate of the angle dependent RC with
corresponding reflection angle and weight function.

2.

Method, according to claim 1,   c h a r a c t e r i z e d   b y   setting
the RC in d) to 1.0 in the calculation of the synthetic traces.

3.

Method, according to claim 1,   c h a r a c t e r i z e d   b y   using
the same weights $w_i(\vec{x})$ in the local PSDM in e) as in the PSDM in a).

4.

Method, according to claim 1,   c h a r a c t e r i z e d   b y   using
"square" method or "norm" method for measuring the amplitudes in f).

5.

Method, according to claim 1, c h a r a c t e r i z e d   b y repeating the process in a)-f) for points along the target reflector to create a map of the RC for the target reflector.

6.

Method, according to claim 1, c h a r a c t e r i z e d   b y computing the synthetic traces in c) by ray tracing.

7.

An article of manufacture comprising:

- a computer usable medium having computer readable program code embodied therein for finding the Reflection Coefficient (RC) of reflectors in the subsurface, the computer readable program code in said article of manufacture comprising:

a) computer readable program code for causing a computer to migrate to depth recorded traces in a survey by Pre-Stack Depth Migration (PSDM), thereby achieving a real depth migrated seismic cube ($P_{Obs}(\vec{x})$) which is a function of the recorded traces that each has been given a weight $w_i(\vec{x})$;

b) computer readable program code for causing a computer to interpret $P_{Obs}(\vec{x})$ to find the reflectors in the subsurface, based on these reflectors and the seismic velocities an earth model is established in the computer, one of the reflectors in the earth model is chosen to be the target reflector;

c) computer readable program code for causing a computer to compute synthetic traces from the target reflector from all shot/receiver pairs in the survey that was used in a);

c h a r a c t e r i z e d   b y

d) computer readable program code for causing a computer to set the RC of the target reflector in the depth model to an essentially constant value when the synthetic traces are computed;

e) computer readable program code for causing a computer to perform a local PSDM of the synthetic traces in a band around the target reflector to obtain a modeled PSDM cube $P_{Mod}(\vec{x})$; and

f) computer readable program code for causing a computer to measure the amplitudes along target reflector on the real PSDM cube $P_{Obs}(\vec{x})$, dividing these measurements with the corresponding measurements from the modeled PSDM cube $P_{Mod}(\vec{x})$, obtaining an estimate of the angle dependent RC with corresponding reflection angle and weight function.

8.

Computer program, according to claim 7, c h a r a c t e r i z e d
b y setting the RC in d) to 1.0 in the calculation of the synthetic traces.

9.

Computer program, according to claim 7, c h a r a c t e r i z e d
b y using the same weights $w_i(\vec{x})$ in the local PSDM in e) as in the PSDM in a).

10.

Computer program, according to claim 7, c h a r a c t e r i z e d
b y using "square" method or "norm" method for measuring the amplitudes in f).

11.

Computer program, according to claim 7, c h a r a c t e r i z e d
b y repeating the process in a)-f) for points along the target reflector to make a map
of the RC for the target reflector.

12.

Computer program, according to claim 7, c h a r a c t e r i z e d
b y computing the synthetic traces in c) by ray tracing.